

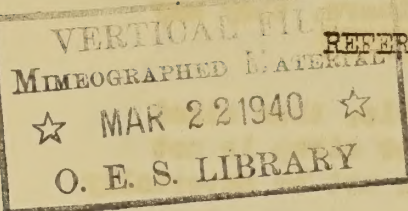
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PUBLIC HEALTH ASPECTS OF FROZEN FOODS WITH PARTICULAR

REFERENCE TO THE PRODUCTS FROZEN IN COLD STORAGE

LOCKERS AND FARM FREEZERS*



Note: The following excerpts, of particular interest to extension workers who are helping to guide the developing freezer locker movement, are mimeographed by special permission. Watch the American Journal of Public Health and the Nation's Health for the full report of this committee.

General principles: *****Research work conducted in the Chemical Laboratory of the New York State (Geneva) Agricultural Experiment Station(1)** has shown very clearly that, other considerations being the same, the higher the storage temperature, the more rapidly rancidity develops in frozen meat. Furthermore, pork turns rancid more rapidly than beef. Thus, frozen pork can be kept in good condition at 15° F. for only 2 months; at 10° F. it keeps free from rancidity for about 3 months and becomes very rancid shortly thereafter; at 0° F. pork will keep free from rancidity for at least 8 months.

Fluctuating temperatures in cold storages where meat and poultry are maintained cause a rapid deterioration of the quality of the products, because the fluctuations speed up desiccation. They also accelerate crystal growth in the frozen product and consequently increase leakage when the product is thawed.

Another point which should be indicated is that in order to reduce desiccation all foods must be packed in moisture-vapor-proof containers or wrappers before being frozen. The fats of desiccated meats turn rancid much more quickly than those of meats not subject to desiccation.

The prevention of development of rancidity in fatty meats, especially in liver and other organs which are relatively high in vitamin A, is of importance both from the standpoint of palatability and public health. Lease, Lease, Weber and Steenbock(2) have shown that vitamin A is very rapidly lost from rancid fats. Thus it appears that frozen liver stored at high temperatures (e.g. 10° to 15° F.) would slowly lose vitamin A...

*Report of the Committee on Foods (Except Milk), of the Food and Nutrition Section, American Public Health Association. Presented at the sixty-eighth annual meeting of the Association at Pittsburgh, Pa., Oct. 17, 1939.
**Numbers in parentheses refer to citations listed on page 5.

Fruits. - Rapid freezing is not as important in the case of fruits as in the case of meats and poultry. If fruits of the proper variety and maturity are properly prepared and packaged in small containers, they may be sharp frozen and products of excellent quality obtained.

In general, fruits should be prepared as for the table, then mixed with sugar or covered with a heavy sugar sirup. If sugar or sirup is not added, the product will be much less palatable, but it will not be materially less wholesome.

Storage of frozen fruits at high temperatures, e.g. + 10° to + 15° F., results in a slow loss of quality (color, flavor, and vitamin C); but even after a year's storage, the product will still be edible, provided it was packed with sugar or sirup.

Vegetables. - All vegetables require special treatment prior to packaging. This treatment involves, in addition to the usual sorting, cleaning, and washing processes, blanching (scalding) in order to inactivate enzymes. This treatment must be sufficiently severe to raise all parts of the vegetable to 180° F. or higher. During storage, unblanched vegetables not only develop undesirable flavors but also lose a considerable proportion of their vitamin C, unless held at very low temperatures (e.g. - 40° F.).

Even properly blanched vegetables gradually lose their vitamin C content at temperatures above 0° F. Snap beans and spinach require even lower temperatures⁽³⁾ if they are to retain high vitamin C potency for longer than 4 months.

The need for care in the selection, handling, freezing, and storage of foods. - From the foregoing consideration of the principles of preparation, freezing, and storage of foods, it is evident that the freezing of foods is not as simple a matter as most persons believe. Further, it is clear that great care should be taken in the handling of foods to be frozen.

Regulations designed to license cold-storage locker plants should be put in effect. These regulations should not only provide for periodic health examination for employees handling food and for the examination of the sanitary condition of the plant, but should also require that the foods be frozen under conditions which will insure moderately fast freezing and that the frozen products be maintained at a uniform temperature not higher than + 5° F., and preferably 0° F. at all times. At such temperatures, practically all foods can be kept in excellent condition for at least 8 months if they have been properly prepared and packaged.

The only State law requiring the licensing of refrigerated locker plants is that passed in Iowa⁽⁴⁾ this spring. This law calls for the inspection of the sanitary conditions of all proposed plants prior to the issuing of the license. It also provides that "Every refrigerated locker plant shall be maintained in a sanitary condition and conducted with strict regard to the influence of such conditions upon the food handled

therein and any licensee under this chapter who fails to comply therewith shall suffer a revocation of his license." All foods are required to be sharp frozen (in a room maintained at 0° F. or below) prior to being put in a locker. Further, there is the rather general provision that: "No article of food shall be stored in any refrigerated locker unless it is in a proper condition for storage and meets all of the requirements of the pure food and food sanitation laws and such rules as may be established by the department for the sanitary preparation of food products which are to be stored."

These regulations are all very good and if enforced would seem to be adequate to control sanitation in the plants. It would be well, however, to add a paragraph requiring periodic health examinations for locker employees actually engaged in handling of foods.

There is one provision of this law that is entirely inadequate; it is the section specifying the temperature at which the lockers be maintained. This requires that the food in the locker "be kept at a temperature of 12° to 15° F. during the period it is kept therein." As has already been pointed out, the fat of pork and other meats turns rancid quickly at this temperature; further, fruits and vegetables lose their bright colors, fine flavors, and vitamin C. content rapidly. The temperature specified should be preferably 0° F. and in any case not higher than +5° F.

Since farm freezers are being installed in farm homes, it is difficult to see how their operation can be regulated by legislation. Probably the best way to insure proper construction of these freezers and the use of correct procedures in preparing, freezing, and storing foods will be to disseminate widely information concerning the basic principles of the freezing preservation of the foods. The companies building farm freezers can be relied on to design and construct equipment on basically sound engineering principles. These companies may be counted on to cooperate with agricultural extension workers in passing on to the users of farm freezers any information which may be available on methods of preparing, freezing, and storing meats, poultry, fruits, vegetables, and other foods. The agricultural experiment-station workers and others who may have special knowledge of food freezing should make this information immediately available to those in need of it. Unsolved problems, ⁽¹⁾ such as whether or not aging of meat to be frozen in farm freezers is beneficial, should be studied. This problem and many others connected with the use of farm freezers are being investigated at the New York State (Geneva) Agricultural Experiment Station, and certain other institutions.

Advantages to be derived from the more general use of low-temperature refrigeration. * * * * * Residents of rural regions, who freeze their foods either in lockers or in farm freezers, will have a much more varied, less monotonous, and better balanced diet than they have had heretofore. In many cases they will preserve foods from their own gardens and orchards which would otherwise go to waste. If low storage temperatures are maintained in the freezers, the products will, on the average, be richer in vitamin C

and other easily oxidizable vitamins than would be the case had they been preserved in some other way. In many rural sections of the country malnutrition is prevalent during the winter and early spring months. In Aroostook County, Maine, for instance, a survey of the health of the people of that area indicated that in the late winter, many persons were suffering from mild cases of scurvy. The general use of freezing preservation for vegetables and fruits would increase the vitamin C content of the average diet and reduce the prevalence of this dietary deficiency disease.

Freezing preservation, at the temperatures commonly employed in cold-storage lockers and farm freezers, kills trichinosis organisms(5). Thus when frozen pork is eaten, the danger of contracting trichinosis is entirely eliminated.

In conclusion then, it may be said that while freezing preservation is not as simple a method of preserving foodstuffs as many think and while there are hazards which may be encountered because of carelessness in preparing and freezing easily perishable foods such as vegetables, yet the extended use of freezing preservation in rural regions will result in better nutrition of the people of those areas.

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